



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/526,444

03/01/2005

Uwe Bernhard Stein

1025-P03582US0

3127

110

7590

07/01/2009

DANN, DORFMAN, HERRELL & SKILLMAN  
1601 MARKET STREET  
SUITE 2400  
PHILADELPHIA, PA 19103-2307

EXAMINER

KASTURE, DNYANESH G

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

07/01/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/526,444	<b>Applicant(s)</b> STEIN ET AL.	
	<b>Examiner</b> DNYANESH KASTURE	<b>Art Unit</b> 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,651,545 to Nippert (Nippert) in view of U.S. Patent 5,456,581 to Jokela et al. (Jokela et al.)

3. In Re claim 1, Nippert teaches a fluid-working machine having a plurality of working chambers of cyclically changing volume (see figure 4), a high-pressure fluid manifold and a low- pressure fluid manifold (high and low pressure accumulators (28, 26)), at least one valve (valves (64 and 66)) linking each working chamber to each manifold, and an electronic sequencing controller (controller (24)) for operating said valves in timed relationship with the changing volume of each chamber, wherein the electronic sequencing controller is arranged to operate the valves of each chamber in one of:

- an idling mode (see column 8 lines 53-67, where piston can be locked in the top dead center position, and thus no fluid is pumped),

Art Unit: 3746

- a partial mode (see column 8 lines 43-50, where only a portion of the regular fluid amount is pumped) in which only part of the usable volume of the chamber is used (only part of the usable volume of fluid is pumped),
- and a full mode (see column 7, lines 32- 65, where full strokes are discussed) in which all of the usable volume of the chamber is used,
- and the electronic sequencing controller is arranged to select the mode of each chamber on successive cycles: Column 8 Line 27 states "In order to vary displacement of the fluid pump 12, any one of the plurality of pistons 46 is SELECTIVELY stopped", Column 8, Lines 43-45 state "The displacement of fluid pump 12 can also be varied .. .. accomplished by permitting the SELECTED one or ones of pistons 46 to effectively pump a portion ..". The selection of each piston's mode must occur at some point in time, and each of these points could be considered the start of a cycle. In this way, the apparatus of Nippert chooses the pistons' modes on successive cycles,
- so as to vary the time averaged effective flow rate of fluid through the machine: The displacement of the fluid pump is directly related to the flow rate because flow rate is simply the displacement volume per unit time. Therefore varying the time averaged effective flow rate is simply a matter of varying the displacement volume (taught by Nippert) if the speed of the shaft is constant. For a given shaft speed, the time for one complete rotation of the shaft is also the time for one cycle of displacement volume. For a constant speed, the time averaged flow rate is the ratio of the displacement volume for one cycle divided by the time for one complete rotation of the shaft.

Art Unit: 3746

4. In any case, Lines 1-3 of the Abstract of Jokela et al state: " A multi-piston pump is provided which uses microprocessor controlled check all valves to control FLOW RATE of a fluid at the pump's outlet port", thereby providing evidence that a desired flow rate can be one of the objectives in a pumping process, thereby motivating one of ordinary skill to perform the above calculation to determine the flow rate from the displacement volume.

5. The word "control" in the phrase "control the flow rate" in the Abstract of Jokela et al makes it obvious to one having ordinary skill in the art at the time of the invention to define a user specified set-point for the desired flow rate of the apparatus of Nippert. Even if the speed of the shaft is not constant, Jokela et al discloses a shaft encoder (102) which senses the angular position of the shaft, Nippert also discloses a speed and position sensor (22), and the microprocessor (104) of Jokela et al is capable of keeping track of time as stated in Column 4, Line 45: ".. sample rate about every 0.1 millisecond", therefore the time for completion of one full rotation of the shaft would be obvious to one having ordinary skill in the art at the time of the invention; this is also the time for the pump to complete one cycle of displacement; and the time averaged flow rate would then be the pump displacement for the cycle divided by the cycle time.

6. In Reference to Claim 2, Nippert as modified by Jokela et al. teaches a machine according to claim 1 (see the rejection of claim 1 above), wherein the partial mode comprises the use of only a small fraction of the usable volume of the chamber (see

Art Unit: 3746

column 8 lines 26-52, where the pistons only expel fluid during part of the stroke, and thus only a portion of the volume of the chamber is used to pump).

7. In Reference to Claim 3, Nippert as modified by Jokela et al. teaches a machine according to claim 1 (see the rejection of claim 1 above), operable as both a pump and a motor (see column 2 lines 40-43 of Nippert), each chamber having five selectable modes, namely idling mode (see column 8 lines 53-67, where piston can be locked in the top dead center position, and thus no fluid is pumped), partial motoring mode (similar to partial pumping mode in that only a portion of fluid is used to actuate the motor, but the inlet leads from the high pressure manifold and the outlet leads to the low pressure manifold), full motoring mode (similar to full pumping mode in that a full stroke is performed, but the inlet leads from the high pressure manifold and the outlet leads to the low pressure manifold, see column 9 lines 46-59), partial pumping mode (see column 8 lines 26-52, where the pistons only expel fluid during part of the stroke, and thus only a portion of the regular fluid amount is pumped) and full pumping mode (see column 7, lines 32-65, where full strokes are discussed).

8. In Reference to Claim 4, Nippert as modified by Jokela et al. teaches a machine according to claim 1 (see the rejection of claim 1 above), wherein the working chambers comprise cylinders (piston bores (44)) in which pistons are arranged to reciprocate (pistons (46)).

Art Unit: 3746

9. In Reference to Claim 5, Nippert as modified by Jokela et al. teaches a machine according to claim 4 (see the rejection of claim 4 above), wherein partial pumping mode includes closing the valve linking the cylinder to the low-pressure manifold and opening the valve linking the cylinder to the high-pressure manifold a small fraction in advance of the top dead centre position of the piston (Nippert discloses that in partial pumping mode it is possible to pump a first portion of the volume, bypass an intermediate portion, and pump the remaining portion. That is, after the bypassed portion, the high pressure valve would need to open to allow the fluid to be pumped, while the low pressure valve would need to close to prevent the bypass effect.).

10. In Reference to Claim 6, Nippert as modified by Jokela et al. teaches a machine according to claim 4 (see the rejection of claim 4 above), wherein partial motoring mode includes closing the valve linking the cylinder to the high-pressure manifold and opening the valve linking the cylinder to the low- pressure manifold a small fraction after the top dead centre position of the piston (Partial motoring mode operates in a manner similar to partial pumping mode. Therefore it would be possible to use a first portion of the volume to create rotary motion, bypass an intermediate portion, and use the remaining portion of the volume to create motion. Thus, after the bypassed portion, the low pressure valve would need to open to allow the fluid to be pumped, while the high pressure valve would need to close to prevent the bypass effect.).

Art Unit: 3746

11. In Reference to Claim 7, Nippert teaches a method of operating a fluid-working machine having a plurality of working chambers of cyclically changing volume (see figure 4), a high-pressure fluid manifold and a low-pressure fluid manifold (high and low pressure accumulators (28, 26)), at least one valve (valves (64 and 66)) linking each working chamber to each manifold, comprising operating the valves of each chamber in one of an idling mode, a partial mode in which only part of the usable volume of the chamber is used, and a full mode in which all of the usable volume of the chamber is used. Nippert and Jokela et al as applied to Claim 1 discloses all the claimed limitations. MPEP 2112.02 states that under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claimed, then the method claimed will be considered to be anticipated by the prior art device.

12. In Reference to Claim 8, Nippert as modified by Jokela et al. teaches a method according to claim 7 (see the rejection of claim 7 above), wherein the partial mode comprises the use of only a small fraction of the usable volume of the chamber (see column 8 lines 26-52, where the pistons only expel fluid during part of the stroke, and thus only a portion of the volume of the chamber is used to pump).



Art Unit: 3746

13. Claims 9 and 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Nippert as modified by Jokela et al., and in further view of U.S. 5,259,738 to Salter et al. (Salter et al.).

14. In Reference to Claim 9, Nippert as modified by Jokela et al. teaches a method according to claim 7 (see the rejection of claim 7 above), but does not teach that the number of chambers to be operated is chosen by an algorithm.

15. Salter et al. teach a similar multi-chambered piston pump apparatus with solenoid actuated valves that control the flow of fluid to each pumping chamber. These valves are actuated by a controller (20) that contains "several built-in algorithms which enable the unit to compare the pump system demand characteristics with system feedback (see column 5 lines 36-55)." The controller's decision to operate each valve occurs every cycle of the pump's operation (see column 6 lines 41-48).

16. It would have been obvious to one of ordinary skill in the art at the time of invention to include control algorithms as taught by Salter et al. in the controller of Nippert as modified by Jokela et al. since Jokela et al. and Nippert does not disclose the exact manner in which the controller operates, and so that the pumping process could be better automated.

17. In Reference to Claim 10, Nippert as modified by Jokela et al. and Salter et al. teaches a method according to claim 9 (see the rejection of claim 9 above), including a preliminary step of selecting whether to operate the machine as a pump or a motor, and

Art Unit: 3746

choosing the algorithm accordingly (Since the apparatus cannot be operated as both a pump and a motor at the same time, a decision would need to be made to determine which mode the apparatus would operate in. A pumping algorithm would be necessary when the apparatus is operated in pump mode, and a motoring algorithm would be necessary when the apparatus is operated in motor mode.).

### ***Response to Arguments***

18. Claims 1-6 are APPARATUS claims because they address a fluid-working machine. Claims to an apparatus have to be STRUCTURALLY different from prior art to distinguish them from the prior art. Applicant's disclosure page 6 states: "The machine described in EP-A-0494236 and shown in Figure 1 can be adapted to provide a machine according to the invention WITHOUT ADDITIONAL HARDWARE to create a part-stroke mode. The adaptation consists of increasing the functionality and complexity of the microprocessor control algorithms.", which suggests that applicant's invention is to a METHOD OF OPERATING the prior art device without introducing additional hardware. Method claims are different from apparatus claims and need to incorporate the word "method" (like applicant did in claims 7-10). Claims 1-6 are unpatentable over prior art for at least the above reasons, since there are no structural differences between the claimed apparatus and the prior art (Nippert and applicant's disclosure of prior art). MPEP 2114 states in the second paragraph: "While features of an apparatus

Art Unit: 3746

may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of STRUCTURE RATHER THAN FUNCTION.” In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997)

19. Applicant has argued that the teachings of Jokela et al cannot be applied to Nippert due to substantial differences between the apparatus of Jokela et al and Nippert.

20. Examiner’s Response: With reference to claims 1 and 7, Jokela et al was relied on ONLY for the following teachings: 1) a microprocessor is capable of controlling check ball valves to control flow rate; 2) a microprocessor is capable of keeping track of time; 3) a shaft encoder can determine the angular position of a shaft. Applicant’s arguments address isolated teachings of the Jokela et al reference, such as the number of valves being controlled and the lack of “partial strokes”, without considering what the reference AS A WHOLE would mean to one of ordinary skill in the art. MPEP 2141.02, Section VI states that a prior art reference must be considered in its entirety, i.e., AS A WHOLE, including portions that would LEAD AWAY from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). The examiner contends that the above three teachings will be apparent to one of ordinary skill after reading the Jokela et al reference, and that it is within the capability of one having ordinary skill to apply those teachings to the

Art Unit: 3746

Nippert reference in the manner described in the analysis. The applicant cannot show non-obviousness by attacking the Jokela et al reference for failure to disclose teachings that the Nippert reference was relied on (for example "partial" strokes). MPEP 2145, Section IV states: One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Note further that column 3, lines 44-66 of Jokela et al teaches a multi-piston pump where the pistons can either undergo a full pumping stroke or can return unneeded fluid back through the inlet valve, analogously to two of the operational modes (full displacement, idle) of Nippert in Columns 6 and 7; - It has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992).

21. Applicant has argued that examiner has allegedly based the obviousness rejection on hindsight and that there is no suggestion by Nippert, Jokela et al or any other prior for combining partial strokes with idle strokes in a sequence.

22. Examiner's Response: As an initial observation, the limitation "combining partial strokes with idle strokes in a sequence" has not been claimed in any of the claims. That aside, as long as the partial stroke and idle stroke occur at least once in the operation of

Art Unit: 3746

the Nippert device, they would have to be in SOME sequence (the specifics of the sequence is not in the claims either). With regards to applicant's hindsight argument, the examiner contends that the ONLY disclosure referenced in applicant's specification was admitted prior art. Applicant has clearly stated that EP-A-0361927 and EP-A-0494236 are prior art in the section "Background to the Invention", therefore the entire content of these patents is incorporated by reference as admitted prior art. The patent EP-A-0494236 discloses the following in the section "Flow Control Mode" on Page 4, Column 6: "The controller 20 keeps a running account of the displacement demand (from either a fixed level or an external input such as an operator joystick) and the displacement produced by the pump. At each cylinder enabling opportunity the controller 20 decides whether the demand foreseen at the time of maximum effectiveness of the current cylinder justifies its being enabled. This occurs if the displacement account will be at a deficit of more than half of a cylinder". The cylinder is therefore enabled (full mode) if the deficit of displacement volume is more than half the capacity of the cylinder and disabled (idling mode) if the deficit is less than or equal to half the capacity of the cylinder. One of ordinary skill will recognize this handicap of not being able to precisely match the account "deficit" due to the lack of the "partial" mode and therefore be motivated to the Nippert reference which discloses the partial mode in Column 8, Lines 43-50: "... effectively pump a PORTION of their total volume and bypass the remaining portion ... it is possible to pump a first portion of the volume, bypass an intermediate portion and pump the remaining portion of the total volume of fluid". If the "account deficit" in the modified apparatus is zero then the chamber is

Art Unit: 3746

disabled which is the idling mode, when the “account deficit” is non zero - this generates the partial or full mode. The specific sequence of modes leading to the desired flow rate is within the capability of one having ordinary skill in the art since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art - MPEP 2144.05 (II-A). Note that Page 5, Column 7 of the EP-A-0494236 patent also discloses that “It will, for example, be possible to programme the operation of a pump so that its output varies from CYCLE to CYCLE” thereby additionally disclosing the Claim 1 limitation “select the mode of each chamber on successive cycles”.

### ***Conclusion***

23. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 3746

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/  
Supervisory Patent Examiner, Art  
Unit 3746

DGK